SANblade 2300 Series User's Guide

2-Gb Fibre Channel to cPCI and SBus Host Bus Adapters

Document Revision History	
Rev. A release, 4/23/02	
Rev. B update, 5/2/02	
Rev. C update, 9/17/02	
Rev. D update, 2/14/03	
Rev. E update, 8/22/03	
Rev. F update, 9/29/03	
Changes	Document Sections Affected
Added FDMI support	1.4
Added FC-SP support	1.4

First Printed: March 2002
Printed in U.S.A.

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Section 1
Introduction

1.1 How to Use this Guide

The SANblade QLogic host bus adapters (HBAs) supported in this document are described in the following paragraphs. They are collectively referred to as the ***QCP/QSB23xx HBA*** unless otherwise noted. The QCP23*xx* HBAs are all 64-bit PCI to Fibre Channel optical media. The QSB23xx HBAs are all 64-bit SBus to Fibre Channel optical media.

- **QCP2330** (cPCI to single-channel)
- **QCP2332** (cPCI to dual-channel)
- **QCP2340** (cPCI to single-channel)
- **QCP2342** (cPCI to dual-channel)
- **QSB2340** (SBus to single-channel)
- **QSB2342** (SBus to dual-channel)

First, install the QCP/QSB23*xx* HBA according to the directions in the appropriate hardware installation section. Second, install the Solaris driver. If the device attached to the HBA is the boot device, install the FCode.

1.2 General Description

Thank you for selecting the QCP/QSB23*xx* Fibre Channel (FC) HBA. The QCP/QSB23*xx* HBA is a single- or dual-channel, intelligent, high-performance, DMA bus master host adapter designed for high-end systems. The intelligence and performance are derived from the ISP23*xx* controller, making the QCP/QSB23*xx* HBA a leading-edge host adapter. The ISP23*xx* combines a powerful RISC processor and a fibre protocol module (FPM) with one 2-Gb Fibre Channel transceiver in a single-chip solution. The QCP/QSB23*xx* HBA supports all FC peripherals that support private loop direct attach (PLDA) and fabric loop attach (FLA). Installation of the QCP/QSB23*xx* board is quick and easy.

1.3 What is Fibre Channel?

Fibre channel technology is outlined in the *SCSI-3 Fibre Channel Protocol* (SCSI-FCP) standard. Fibre Channel is a high-speed data transport technology used for mass storage and networking. It connects mainframes, super computers, workstations, storage devices, and servers.

Two-gigabit Fibre Channel supports data transfer rates of 200 MBps half-duplex and 400 MBps full-duplex. The QCP/QSB23*xx* HBA uses a multimode optical

interface for intermediate distances (less than 500 meters at the data rate of 1 Gbps; less than 300 meters at the data rate of 2 Gbps).

With increased connectivity and performance, Fibre Channel is the technology preferred and used by system designers.

1.4 Features

- Compliance with the following PCI standards (QCP HBAs):
  - *PCI Local Bus Specification*, revision 2.1
  - *PCI Hot Plug Specification*, revision 1.0
  - *PCI Power Management Interface Specification*, revision 1.0
  - *PICMG 2.0 Compact PCI Specification*, revision 2.1
  - *CompactPCI Hot Swap Specification,* revision 2.1
- Compliance with *SBus Specification*, IEEE std 1496-1993 (QSB HBAs)
- Compliance with the following Fibre Channel standards:
  - *Second Generation Fibre Channel Physical and Signaling Interface* (FC-PH-2), revision 7.4
  - *Third Generation Fibre Channel Physical and Signaling Interface* (FC-PH-3), revision 9.2
  - *Fibre Channel-Arbitrated Loop* (FC-AL-2), revision 5.4
  - *Fibre Channel Fabric Loop Attachment* (FC-FLA), revision 2.7
  - *Fibre Channel Generic Services 2* (FC-GS-2), revision 5.3
  - *Fibre Channel Switched Fabric* (FC-SW), revision 3.3
- Compliance with U.S. and international safety and emissions standards
- Support for bus master DMA
- Supports Fibre Channel SCSI (FCP-SCSI) protocol
- Supports point-to-point fabric connection (F-PORT FABRIC LOGIN)
- Supports Fibre Channel security protocol (FC-SP) using DH-CHAP
- Supports fabric device management interface (FDMI)

  Using FDMI, storage area network (SAN) administrators can view device-specific information (for example, driver version, firmware version, and model number) from a central console, regardless of the device manufacturer. This information is kept at the FC switch and viewed through the switch's management application or third party SAN management applications.

Part I
Hardware

This part of the *SANblade 2300 User's Guide* describes the host bus adapters (HBAs) and how to install and configure them. See the section that corresponds to your HBA. Section 5 contains troubleshooting information.

HBA	Section
QCP2330/2332	2
QCP2340/2342	3
QSB2340/2342	4

Notes

Section 2

QCP2330/2332

2.1 QCP2330/2332 HBA Components

Figure 2-1 identifies the QCP2330/2332 HBA components referenced throughout this section.

Each QCP2330/2332 HBA has a unique serial number, located on the back of the HBA. Take a minute to write down the serial number of the QCP2330/2332 HBA in the unlikely event that the NVRAM is corrupted.

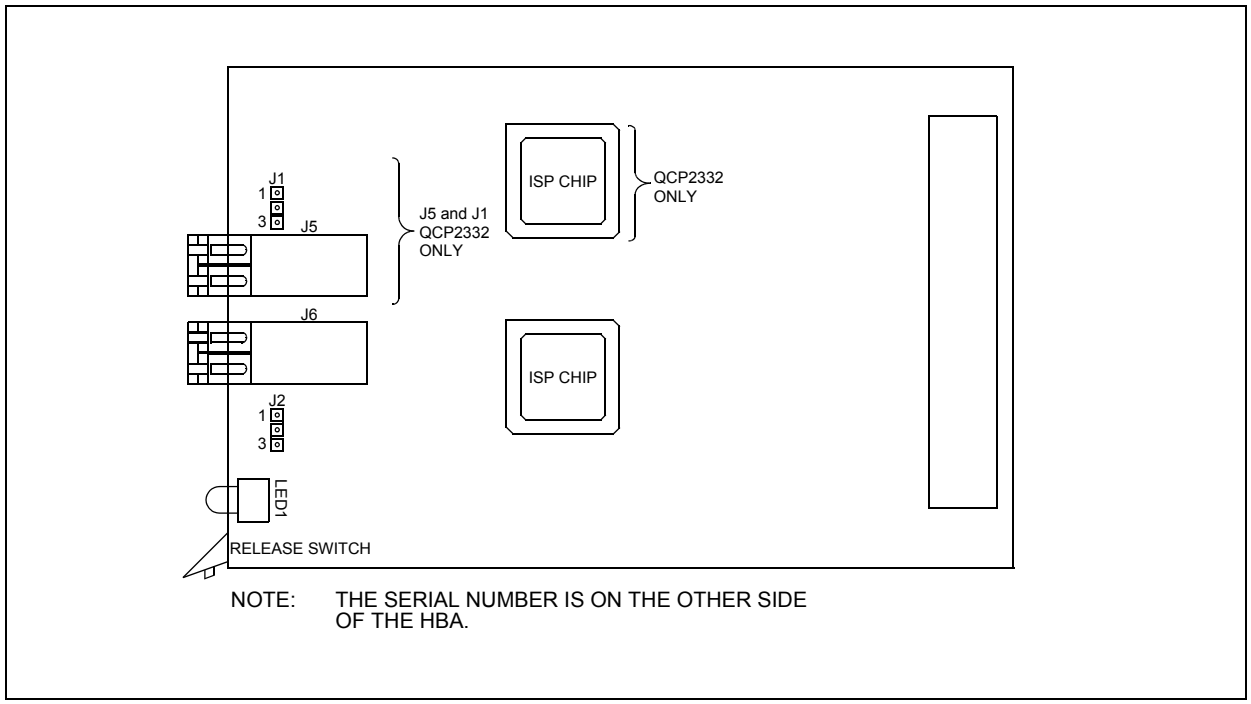

Figure 2-1. QCP2330/2332 HBA Layout

2.1.1 LEDs

In a standard installation, LED1 is off, indicating that the HBA is active.

In a hot swap installation, LED1 turns blue while the HBA is inserted. If the LED turns off, the HBA is inserted and has been configured.

2.1.2 Jumpers

Jumpers J1 (QCP2332) and J2 on the QCP2330/2332 HBA determine the default state of connectors J5 (QCP2332) and J6, respectively. The jumpers are set at the factory with a jumper plug on pins 2–3, which enables the connectors.

CAUTION! Changing the jumper settings can result in the HBA being inoperable.

2.2 Installation and Removal

The following sections describe how to install the QCP2330/2332 HBA (standard and hot swap installations) as well as how to remove the HBA.

Before you install the QCP2330/2332 HBA in your computer, you need the following:

- A screwdriver (usually a Phillips #1)
- An optical, multimode cable with an LC-style duplex connector

2.2.1 Installation in the Computer (Standard)

Perform the following steps to install the QCP2330/2332 HBA in your system. These instructions are for a standard installation (the computer is shut down). See section 2.2.2 for hot swap instructions.

1. Shut down the system.
2. Choose any available cPCI slot. (Check the indicator lights next to (or above) the available slots. The top two lights are off; the bottom light is amber.)
3. Place the QCP2330/2332 HBA into the slot. Carefully press the HBA into the slot until it seats firmly (the switch clicks into a locked position when the HBA is seated).
4. Connect the appropriate cables from the devices to the J5 (QCP2332) and J6 connectors.
5. Power up all external FC devices, then power up the system and observe the monitor. The HBA will not appear as part of the system components unless the driver has been installed; in which case, the HBA and corresponding driver are listed.
6. Check the QCP2330/2332 HBA hot swap LED1; it should be off, indicating that the HBA is active. The bottom indicator light next to the slot should be green (in some systems, the lights are above the slots).

See section 6 for detailed instructions on how to install the software driver.

If you need FCode, see section 2.4 for instructions on how to install or update the FCode on the QCP2330/2332 HBA.

2.2.2 Installation in the Computer (Hot Swap)

Perform the following steps to install the QCP2330/2332 HBA without shutting down the system (hot swap). See section 2.2.1 for standard installation instructions.

1. Log on to the system as a superuser.
2. At the prompt (#), type the following command to find an available slot for the QCP2330/2332 HBA:

   ```
   cfgadm
   ```

   A list of the system's processors, memory, and I/O boats appears, as in the following example. In this example, cPCI slots 0, 1, 3, and 4 are available.

Ap_Id	Type	Receptacle	Occupant	Condition
N0.IB6	cPCI_I/O_bo	connected	configured	ok
N0.IB8	unknown	empty	unconfigured	unknown
N0.SB0	CPU_Board	connected	configured	ok
N0.SB2	CPU_Board	connected	configured	ok
c0	scsi-bus	connected	configured	unknown
pcisch0:sg6slot2	stpcipci/fhs	connected	configured	ok
pcisch0:sg6slot3	unknown	empty	unconfigured	unknown
pcisc1:sg6slot0	unknown	empty	unconfigured	unknown
pcisch2:sg6slot4	unknown	empty	unconfigured	unknown
pcisch2:sg6slot5	unknown	connected	unconfigured	unknown
pcisch3:sg6slot1	unknown	empty	unconfigured	unknown

   NOTE: If the cPCI slots are not displayed, add the following line to the etc/system file:

   ```
   set sghsc:cpci_enable=1
   ```

   Check the indicator lights next to the available slots (in some systems, the lights are above the slots). The top two lights are off; the bottom light is amber. This is another way to verify an available slot.
3. Place the QCP2330/2332 HBA into the slot. Carefully press the HBA into the slot until it seats firmly (the switch clicks into a locked position when the HBA is seated). The bottom indicator light next to (or above) the slot changes from amber to off. The top indicator light turns green.

   The hot swap LED1 on the QCP2330/2332 HBA turns blue while the HBA is inserted. If LED1 turns off, the HBA is inserted and has been configured; continue with step 6. If LED1 stays blue after the HBA is inserted, continue with step 4.

4. Type the cfgadm command (see step 2) to verify that the system recognizes the QCP2330/2332 HBA and that the HBA is not configured. In the following example, the QCP2330/2332 HBA has been installed in slot 4 and is not configured.

Ap_Id	Type	Receptacle	Occupant	Condition
N0.IB6	cPCI_I/O_bo	connected	configured	ok
N0.IB8	unknown	empty	unconfigured	unknown
N0.SB0	CPU_Board	connected	configured	ok
N0.SB2	CPU_Board	connected	configured	ok
c0	scsi-bus	connected	configured	unknown
pcisch0:sg6slot2	stpcipci/fhs	connected	configured	ok
pcisch0:sg6slot3	unknown	empty	unconfigured	unknown
pcisc1:sg6slot0	unknown	empty	unconfigured	unknown
pcisch2:sg6slot4	unknown	disconnected	unconfigured	unknown
pcisch2:sg6slot5	unknown	connected	unconfigured	unknown
pcisch3:sg6slot1	unknown	empty	unconfigured	unknown

5. Type the following commands to configure the QCP2330/2332 HBA:

   ```
   cfgadm -c configure slot path
   ```

   For example, type the following commands to configure the QCP2330/2332 HBA in slot 4, as shown in step 4:

   ```
   cfgadm -c configure pcisch2:sg6slot4
   ```

   The system configuration is as follows:

Ap_Id	Type	Receptacle	Occupant	Condition
N0.IB6	cPCI_I/O_bo	connected	configured	ok
N0.IB8	unknown	empty	unconfigured	unknown
N0.SB0	CPU_Board	connected	configured	ok
N0.SB2	CPU_Board	connected	configured	ok
c0	scsi-bus	connected	configured	unknown
pcisch0:sg6slot2	stpcipci/fhs	connected	configured	ok
pcisch0:sg6slot3	unknown	empty	unconfigured	unknown
pcisc1:sg6slot0	unknown	empty	unconfigured	unknown
pcisch2:sg6slot4	stpcipci/fhs	connected	configured	ok
pcisch2:sg6slot5	unknown	connected	unconfigured	unknown
pcisch3:sg6slot1	unknown	empty	unconfigured	unknown

6. Connect the appropriate cables from the devices to the J5 (QCP2332) and J6 connectors.
7. Check the QCP2330/2332 HBA hot swap LED1; it should be off, indicating that the HBA is active.

See section 6 for detailed instructions on how to install the software driver.

If you need FCode, see section 2.4 for instructions on how to install or update the FCode on the QCP2330/2332 HBA.

2.3 Removing the QCP2330/2332 HBA

Follow these steps to unconfigure and remove the QCP2330/2332 HBA.

1. Type the following commands to unconfigure the QCP2330/2332 HBA:

   ```
   cfgadm -c unconfigure slot path
   ```

   For example, type the following commands to unconfigure the QCP2330/2332 HBA in slot 4, as shown in section 2.2.2:

   ```
   cfgadm -c unconfigure pcisch2:sg6slot4
   ```

2. When the QCP2330/2332 HBA hot swap LED1 is blue, remove the cables from the J5 (QCP2332) and/or J6 connectors.
3. Remove the HBA by pressing the release button, then gently pull the HBA out of the slot.

2.4 FCode

This section provides instructions for installing FCode on a QCP2330/2332 HBA installed in a Solaris SPARC system. A QCP2330/2332 HBA with FCode loaded in its flash ROM provides boot capability to its attached devices.

The following files are included. Be sure to review the Readme.txt file for both new and changed information. The naming convention for the associated files and messages is QLA; however, the FCode supports standard QLogic PCI HBAs (*QLAxxxx*) and cPCI HBAs (*QCPxxxx*).

- ifp2300.prom—FCode code binary file
- readme.txt—FCode readme file
- qla2x00flash—Solaris flash utility
- readme—readme for qla2x00flash

The procedure for installing FCode flash is summarized in the following steps and explained in detail in the following sections.

1. Update FCode on the QCP2330/2332 HBA (see section 2.4.1).
2. Set the QCP2330/2332 HBA connection mode (see section 2.4.2).

3. Set the QCP2330/2332 HBA loop ID (see section 2.4.3).
4. Select the boot device (see section 2.4.4).
5. Build the bootable disk (see section 2.4.5).

2.4.1 Updating FCode on the QCP2330/2332 HBA

If you need to update the FCode on the QCP2330/2332 HBA, use the QLogic qla2x00 flash utility. A QLogic Solaris SPARC driver revision 3.06 or later must be installed before the flash utility can be run.

WARNING!! Be very careful when changing flash contents; incorrect data may render the QCP2330/2332 HBA unusable to the point that the operating system may no longer function.

Perform the following steps to run the flash utility:

1. Copy the qla2x00flash file and the ifp2300.prom file to the desired directory.
2. At the command line, enter the appropriate path. Use the information obtained with the **show-devs** command (see step 1 in section 2.4.4). For example:

```
./qla2x00flash -l /devices/pci@1f,0/pci@1/QLGC,qla@4:
devctl ifp2300.prom
```

2.4.2 Setting the QCP2330/2332 HBA Connection Mode

Perform the following steps to view the current QCP2330/2332 HBA connection mode and change it if necessary:

1. To view the current connection mode, type the **show-connection-mode** command:

   ```
   ok show-connection-mode
   ```

   The connection mode and options display. For example:

   ```
   Current HBA connection mode: 1 - Point-to-point only

   Possible connection mode choices:
   0 - Loop Only
   1 - Point-to-point only
   2 - Loop preferred, otherwise point-to-point
   ```

2. If the connection mode is not correct based on the devices connected to the QCP2330/2332 HBA, change it using the **set-connection-mode** command. For example:

   ```
   ok 0 set-connection-mode
   ```

The new connection mode displays. For example:

```
Calculating NVRAM checksum, please wait...

Current HBA connection mode: 0 - Loop Only

Possible connection mode choices:
0 - Loop Only
1 - Point-to-point only
2 - Loop preferred, otherwise point-to-point
```

2.4.3 Setting the QCP2330/2332 HBA Loop ID

When the QCP2330/2332 HBA is currently operating in loop mode (through connection mode 0 or connection mode 2), perform the following steps to view its loop ID and change it if necessary:

1. To view the loop ID, type the **show-adapter-loopid** command.

   ```
   ok show-adapter-loopid
   ```

   The loop ID displays. For example:

   ```
   Adapter loopid - 7c
   ```

2. If the loop ID is not correct, change it using the **set-adapter-loopid** command. For example:

   ```
   ok 0 set-adapter-loopid
   ```

   The new loop ID displays. For example:

   ```
   Adapter loopid - 0
   ```

2.4.4 Selecting the Boot Device

Perform the following steps to select a Fibre Channel device that is attached to the QCP2330/2332 HBA as the boot device:

1. Use the **show-devs** command to display the device tree for all devices attached to the machine.

   ```
   ok show-devs
   ```

   The device tree displays. The QCP2330/2332 HBAs with FCode are referenced with `QLGC,qla@`. For example:

   ```
   ok show-devs
   .
   .
   /pci@1f,0/pci@1/QLGC,qla@4
   ```

2. Select the QCP2330/2332 HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

```
ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```

3. Use the **show-children** command to view the devices attached to the QCP2330/2332 HBA. For example:

```
ok show-children
```

4. The list of devices displays. Write down the boot device's world wide name (WWN), loop ID, and logical unit number (LUN).

5. Save the boot device information to the QCP2330/2332 HBA's NVRAM. Use the **set-boot-id** command. Include the selected QCP2330/2332 HBA's WWN, loop ID, and LUN. For example:

```
ok 2200002037009eeb 82 0 set-boot-id
```

   The following displays:

```
Calculating NVRAM checksum, please wait.... done
Boot device login successful
Boot WWN - 20000020 37009eeb WWPN - 22000020 37009eeb
  Id - 82  Lun - 0
ok
```

6. To boot the QCP2330/2332 HBA, type the complete boot path, including the loop ID and LUN. The loop ID and LUN must match those entered in step 5. For example:

```
ok boot /pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
```

   NOTE: Enter the **reset** command before attempting to boot if the boot was interrupted or any of the QLogic FCode commands were executed.

2.4.5 Building the Bootable Disk

This procedure assumes that the system is already booted from an existing system hard disk, and that you have already performed a full system backup.

The device path on each system differs, depending on the PCI bus slot, target ID, LUN, etc. The device name shown in this example is for a device on the third PCI bus slot, target ID 130, LUN 0, slice 0.

You must have already completed the steps in the previous sections before attempting to create a bootable disk.

To build a bootable disk, perform the following steps:

1. Determine the amount of disk space used/available on your current boot disk. Use the **df** command for a listing. For example:

```
/usr/bin/df -k -l
```

```
Filesystem          kbytes    used     avail    capacity  Mounted on
/dev/dsk/c0t0d0s0   2577118  1650245   875331     66%    /
/proc                     0        0        0      0%    /proc
fd                        0        0        0      0%    /dev/fd
mnttab                    0        0        0      0%    /etc/mnttab
swap                1310480        0  1310480      0%    /var/run
swap                1311344      864  1310480      1%    /tmp
/dev/dsk/c0t0d0s7   5135326      114  5083859      1%    /home
```

   This df example shows that the current boot disk is /dev/dsk/c0t0d0s(x). There are two partitions of interest, slice 0 (/) and slice 7 (/home). Slice 0 uses 1.65 GB and has 875 MB free. Slice 7 uses 114 MB and has 5 GB free. Therefore, slice 7 (/home) contains enough disk space to store the temporary saveset files.

   If there were not at least 1.7 GB free on this disk, you would need to create a partition on the new bootable disk large enough to hold the largest temporary saveset files plus the largest used space on a partition. In this example, it would be a 3.2 GB (1.6 GB+1.6 GB) partition.

2. Use the **format** command to create, label, and format partitions on the new bootable disk. These partitions must be able to contain the contents of your temporary saveset files. If you are not familiar with the **format** command, refer to the Solaris documentation.

   WARNING!! Misusing the **format** command can destroy the data on your current disk drives.

   a. At the root prompt, type `format`.

   b. A list of available hard disks displays. Specify the disk.

   c. At the format prompt, type `partition`.

d. At the partition prompt, type `print`. The partition table displays, as in the following example.

```
Part          Tag    Flag     Cylinders    Size            Blocks
  0           root     wm       0 - 8738     4.00GB  (8739/0/0) 8389440
  1           swap     wu    8739 - 9188   210.94MB  (450/0/0)   432000
  2         backup     wu       0 - 9201     4.21GB  (9202/0/0) 8833920
  3     unassigned     wm              0          0  (0/0/0)          0
  4     unassigned     wm              0          0  (0/0/0)          0
  5     unassigned     wm              0          0  (0/0/0)          0
  6     unassigned     wm              0          0  (0/0/0)          0
  7     unassigned     wm              0          0  (0/0/0)          0
```

e. At the partition prompt, type `label`. Enter the label.

f. At the label prompt, type `quit`.

g. Type `quit` until the system prompt displays.

3. To create the file system, use the **newfs** command. For example:

```
newfs -v /dev/rdsk/c3t130d0s0
```

NOTE: The target device ID (t130) is in decimal. The hexadecimal value for the target ID is used in the boot command line shown in step 11.

4. Mount the boot partition to the /mnt mount point. For example:

```
mount /dev/dsk/c3t130d0s0 /mnt
```

5. Change to the root partition mount point directory. For example:

```
cd /mnt
```

6. Use the **ufsdump** utility to copy the root partition to the new book disk. For example:

```
ufsdump 0f - / | ufsrestore rf -
```

7. Use the **rm** command to delete the restoresymtable file:

```
rm restoresymtable
```

8. Install the boot block on the new boot disk. For example:

```
installboot /usr/platform/`uname -i`
/lib/fs/ufs/bootblk /dev/rdsk/c3t130d0s0
```

9. Edit the new vfstab file to properly mount the new partitions during boot. In this case, each reference to c0t0d0s0 is changed to c3t130d0s0. For example:

```
vi /mnt/etc/vfstab
```

10. Shut down the system. Type the following:

```
/sbin/init 0
```

11. Boot from the newly created boot disk. For example:

```
boot /pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
```

NOTE: The target device ID (`sd@82`) is in hexadecimal. The decimal value is used in step 3.

12. View the current dump device setting. For example:

```
# dumpadm
Dump content: kernel pages
Dump device: /dev/dsk/c0t0d0s1 (swap)
Savecore directory: /var/crash/saturn
Savecore enabled: yes
```

13. Change the dump device to the swap area of the new boot drive. For example:

```
# dumpadm -d /dev/dsk/c3t130d0s1
```

NOTE: Steps 14 and 15 set the newly created boot disk as the default boot disk. These steps are performed at the system OBP (ok) prompt.

14. Create an alias entry for the new boot device (optional). For example:

```
ok nvalias fibredisk /pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
```

15. Set default boot device to be the new boot device (optional). For example:

```
ok setenv boot-disk fibredisk
```

2.4.6 Setting and Viewing the Fibre Channel Data Rate

Use the show-data-rate command to view the current QCP2330/2332 Fibre Channel data rate. For example:

```
ok show-data-rate
Current HBA data rate: One Gigabit rate
```

Use the set-data-rate command to change the current QCP2330/2332 Fibre Channel data rate. For example:

```
ok 1 set-data-rate
Calculating NVRAM checksum, please wait...
Current HBA data rate: Two Gigabit rate
```

Table 2-1 lists the values to enter and their corresponding data rates.

Table 2-1. Fibre Channel Data Rates

Value	Data Rate
0	One gigabit
1	Two gigabits
2	Auto-negotiated rate

2.5 Specifications

Tables 2-2 and 2-3 define the QCP2330/2332 specifications.

Table 2-2. QCP2330/2332 Board Operating Environment

Environment	Minimum	Maximum
Operating temperature	0°C/32°F	55°C/131°F
Storage temperature	–20°C/–4°F	70°C/158°F
Relative humidity (noncondensing)	10%	90%
Storage humidity (noncondensing)	5%	95%

Table 2-3. QCP2330/2332 Board Specifications

Type	Specification
Host bus	Conforms to *PCI Local Bus Specification*, revision 2.1
Fibre Channel specifications	Bus type: fibre optic media Bus transfer rate: 200 MBps maximum at half duplex 400 MBps maximum at full duplex Interface chip: ISP2310 (one in QCP2330; two in QCP2332)
Central processing unit (CPU)	Single-chip design that includes a RISC processor, Fibre Channel protocol manager, DMA controller, and 1-Gb transceivers.
RAM	256K bytes of synchronous SRAM (SSRAM) for each ISP2310
NVRAM	256 bytes for each ISP2310, field programmable
Flash	128K bytes of flash ROM in each ISP2310, field programmable
On-board DMA	Three independent DMA channels: two data and one command. Integrated frame buffer FIFOs (6K-byte receive and 4K-byte transmit) for each data channel.
Connectors	LC-style connector that supports non-OFC, multimode fibre optic cabling using 2×5 fibre optic transceiver module.
Form factor	16.0 cm × 10.0 cm (6.3" × 3.9")
Operating power	Less than 15 watts

2.6 Label

The transceiver on the QCP2330/2332 HBA is a Class I laser product. It complies with IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions.

CLASS I LASER PRODUCT

2.7 Agency Certification

The following sections contain a summary of EMC/EMI test specifications performed on the QCP2330/2332 (CF2310401) to comply with emission, immunity and product safety standards.

2.7.1 EMC/EMI Test Requirements

The QCP2330/2332 conform to the following requirements:

- FCC Part 15, Class A
  - Radiated Emission Class A
  - Conducted Emission Class A
- CNS 13438 Class A
- ICES-003, Class A
- 89/336/EEC EMC Directive CE
  - EN55022:1995 Class A
    - Radiated Emission Class A
    - Conducted Emission Class A
  - EN55024:1998
    - Immunity Standards
    - EN61000-4-2:1995 ESD
    - EN61000-4-3:1995 RF Electro Magnetic Field
    - EN61000-4-4:1995 Fast Transient/Burst
    - EN61000-4-5:1995 Fast Surge Common/Differential
    - EN61000-4-6:1996 RF Conducted Susceptibility
    - EN61000-4-8:1994 Power Frequency Magnetic Filed
    - EN61000-4-11: 1994 Voltage Dips and Interrupt

- EN61000-3-2:1995 Harmonic Current Emission
- EN61000-3-3:1994 Voltage Fluctuation and Flicker

- VCCI, Class A
- AS/NZS 3548, Class AC-tick

2.7.2
Product Safety Requirements

- UL, cUL
  - UL 6095050
  - CSA C22.2 No 60950
  - Class 1 Laser Product per DHHS 21CFR (J)
- 73/23/EEC Low Voltage Directive
  - TUV EN60950:1992 +A1,2,3,4,11
  - TUV EN 60825-1/A11:1996 EN 60825-2

Section 3
QCP2340/2342

3.1 QCP2340/2342 HBA Components

Figure 3-1 identifies the QCP2340/2342 HBA components referenced throughout this section.

Each QCP2340/2342 HBA has a unique serial number, located on the back of the HBA. Take a minute to write down the serial number of the QCP2340/2342 HBA in the unlikely event that the NVRAM is corrupted.

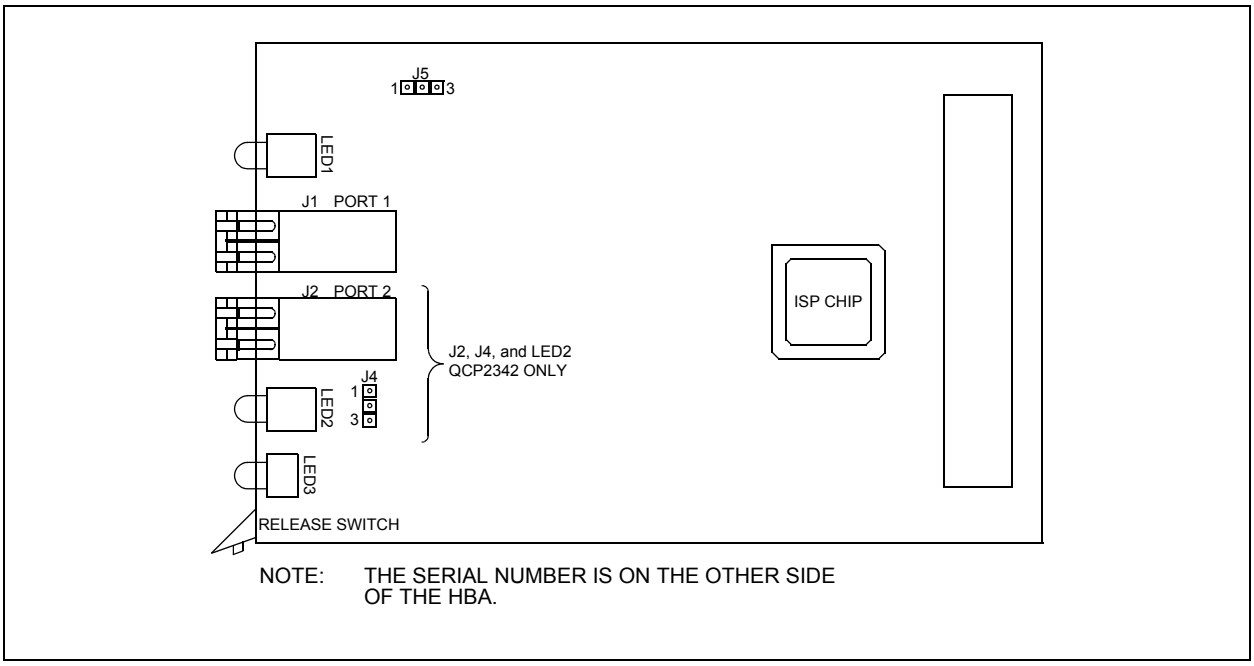

Figure 3-1. QCP2340/2342 HBA Layout

3.1.1 LEDs

The QCP2340/2342 LED1 and LED2 (QCP2342) function as shown in table 3-1.

Table 3-1. LED1 and LED2 (QCP2342) Activity

Green LED	Amber LED	Activity
On	On	Power
On	Off	Online
Off	On	Signal acquired
Off	Flashing	Loss of synchronization
Flashing	Flashing	Firmware error

In a standard installation, LED3 is off, indicating that the HBA is active. In a hot swap installation, LED3 turns blue while the HBA is inserted. If the LED turns off, the HBA is inserted and has been configured.

3.1.2 Jumpers

Jumpers J4 (QCP2342) and J5 on the QCP2340/2322 HBA determine the default state of connectors J2 (QCP2342) and J1, respectively. The jumpers are set at the factory with a jumper plug on pins 2–3, which enables the connectors.

CAUTION! Changing the jumper settings can result in the HBA being inoperable.

3.2 Installation and Removal

The following sections describe how to install the QCP2340/2342 HBA (standard and hot swap installations) as well as how to remove the HBA.

Before you install the QCP2340/2342 HBA in your computer, you need the following:

- A screwdriver (usually a Phillips #1)
- An optical, multimode cable with an LC-style duplex connector

3.2.1 Installation in the Computer (Standard)

Perform the following steps to install the QCP2340/2342 HBA in your system. These instructions are for a standard installation (the computer is shut down). See section 3.2.2 for hot swap instructions.

1. Shut down the system.
2. Choose any available cPCI slot. (Check the indicator lights next to (or above) the available slots. The top two lights are off; the bottom light is amber.)

3. Place the QCP2340/2342 HBA into the slot. Carefully press the HBA into the slot until it seats firmly (the switch clicks into a locked position when the HBA is seated).
4. Connect the appropriate cables from the devices to the J2 (QCP2342) and J1 connectors.
5. Power up all external FC devices, then power up the system and observe the monitor. The HBA will not appear as part of the system components unless the driver has been installed; in which case, the HBA and corresponding driver are listed.
6. Check the QCP2340/2342 HBA hot swap LED3; it should be off, indicating that the HBA is active. The bottom indicator light next to the slot should be green (in some systems, the lights are above the slots).

See section 6 for detailed instructions on how to install the software driver.

If you need FCode, see section 3.4 for instructions on how to install or update the FCode on the QCP2340/2342 HBA.

3.2.2 Installation in the Computer (Hot Swap)

Perform the following steps to install the QCP2340/2342 HBA without shutting down the system (hot swap). See section 3.2.1 for standard installation instructions.

1. Log on to the system as a superuser.
2. At the prompt (#), type the following command to find an available slot for the QCP2340/2342 HBA:

```
cfgadm
```

A list of the system's processors, memory, and I/O boats appears, as in the following example. In this example, cPCI slots 0, 1, 3, and 4 are available.

Ap_Id	Type	Receptacle	Occupant	Condition
N0.IB6	cPCI_I/O_bo	connected	configured	ok
N0.IB8	unknown	empty	unconfigured	unknown
N0.SB0	CPU_Board	connected	configured	ok
N0.SB2	CPU_Board	connected	configured	ok
c0	scsi-bus	connected	configured	unknown
pcisch0:sg6slot2	stpcipci/fhs	connected	configured	ok
pcisch0:sg6slot3	unknown	empty	unconfigured	unknown
pcisc1:sg6slot0	unknown	empty	unconfigured	unknown
pcisch2:sg6slot4	unknown	empty	unconfigured	unknown
pcisch2:sg6slot5	unknown	connected	unconfigured	unknown
pcisch3:sg6slot1	unknown	empty	unconfigured	unknown

NOTE: If the cPCI slots are not displayed, add the following line to the etc/system file:

```
set sghsc:cpci_enable=1
```

Check the indicator lights next to the available slots (in some systems, the lights are above the slots). The top two lights are off; the bottom light is amber. This is another way to verify an available slot.

3. Place the QCP2340/2342 HBA into the slot. Carefully press the HBA into the slot until it seats firmly (the switch clicks into a locked position when the HBA is seated). The bottom indicator light next to (or above) the slot changes from amber to off. The top indicator light turns green.

   The hot swap LED3 on the QCP2340/2342 HBA turns blue while the HBA is inserted. If LED3 turns off, the HBA is inserted and has been configured; continue with step 6. If LED3 stays blue after the HBA is inserted, continue with step 4.

4. Type the cfgadm command (see step 2) to verify that the system recognizes the QCP2340/2342 HBA and that the HBA is not configured. In the following example, the QCP2340/2342 HBA has been installed in slot 4 and is not configured.

Ap_Id	Type	Receptacle	Occupant	Condition
N0.IB6	cPCI_I/O_bo	connected	configured	ok
N0.IB8	unknown	empty	unconfigured	unknown
N0.SB0	CPU_Board	connected	configured	ok
N0.SB2	CPU_Board	connected	configured	ok
c0	scsi-bus	connected	configured	unknown
pcisch0:sg6slot2	stpcipci/fhs	connected	configured	ok
pcisch0:sg6slot3	unknown	empty	unconfigured	unknown
pcisc1:sg6slot0	unknown	empty	unconfigured	unknown
pcisch2:sg6slot4	unknown	disconnected	unconfigured	unknown
pcisch2:sg6slot5	unknown	connected	unconfigured	unknown
pcisch3:sg6slot1	unknown	empty	unconfigured	unknown

5. Type the following commands to configure the QCP2340/2342 HBA:

   ```
   cfgadm -c configure slot path
   ```

   For example, type the following commands to configure the QCP2340/2342 HBA in slot 4, as shown in step 4:

   ```
   cfgadm -c configure pcisch2:sg6slot4
   ```

   The system configuration is as follows:

Ap_Id	Type	Receptacle	Occupant	Condition
N0.IB6	cPCI_I/O_bo	connected	configured	ok
N0.IB8	unknown	empty	unconfigured	unknown
N0.SB0	CPU_Board	connected	configured	ok
N0.SB2	CPU_Board	connected	configured	ok
c0	scsi-bus	connected	configured	unknown
pcisch0:sg6slot2	stpcipci/fhs	connected	configured	ok
pcisch0:sg6slot3	unknown	empty	unconfigured	unknown
pcisc1:sg6slot0	unknown	empty	unconfigured	unknown
pcisch2:sg6slot4	stpcipci/fhs	connected	configured	ok
pcisch2:sg6slot5	unknown	connected	unconfigured	unknown
pcisch3:sg6slot1	unknown	empty	unconfigured	unknown

6. Connect the appropriate cables from the devices to the J2 (QCP2342) and J1 connectors.
7. Check the QCP2340/2342 HBA hot swap LED3; it should be off, indicating that the HBA is active.

See section 6 for detailed instructions on how to install the software driver.

If you need FCode, see section 3.4 for instructions on how to install or update the FCode on the QCP2340/2342 HBA.

3.3 Removing the QCP2340/2342 HBA

Follow these steps to unconfigure and remove the QCP2340/2342 HBA.

1. Type the following commands to unconfigure the QCP2340/2342 HBA:

   ```
   cfgadm -c unconfigure slot path
   ```

   For example, type the following commands to unconfigure the QCP2340/2342 HBA in slot 4, as shown in section 3.2.2:

   ```
   cfgadm -c unconfigure pcisch2:sg6slot4
   ```

2. When the QCP2340/2342 HBA hot swap LED3 is blue, remove the cables from the J2 (QCP2342) and/or J1 connectors.
3. Remove the HBA by pressing the release button, then gently pull the HBA out of the slot.

3.4 FCode

This section provides instructions for installing FCode on a QCP2340/2342 HBA installed in a Solaris SPARC system. A QCP2340/2342 HBA with FCode loaded in its flash ROM provides boot capability to its attached devices.

The following files are included. Be sure to review the Readme.txt file for both new and changed information. The naming convention for the associated files and messages is QLA; however, the FCode supports standard QLogic PCI HBAs (*QLAxxxx*) and cPCI HBAs (*QCPxxxx*).

- ifp2312.prom—FCode binary file
- readme.txt—FCode readme file
- qla2x00flash—Solaris flash utility
- readme—readme for qla2x00flash

The procedure for installing FCode flash is summarized in the following steps and explained in detail in the following sections.

1. Update FCode on the QCP2340/2342 HBA (see section 3.4.1).
2. Set the QCP2340/2342 HBA connection mode (see section 3.4.2).

3. Set the QCP2340/2342 HBA loop ID (see section 3.4.3).
4. Select the boot device (see section 3.4.4).
5. Build the bootable disk (see section 3.4.5).

The QCP2340 has one channel; the QCP2342 has two channels. The code distinguishes between the channels as follows:

- `qla@4` (QCP2340 and QCP2342 (first channel))
- `qla@4,1` (QCP2342 second channel)

Throughout the FCode sections, the examples use `qla@4`;substitute `qla@4,1` for the example to apply to the QCP2342's second channel.

3.4.1 Updating FCode on the QCP2340/2342 HBA

If you need to update the FCode on the QCP2340/2342 HBA, use the QLogic qla2x00 flash utility. A QLogic Solaris SPARC driver revision 3.06 or later must be installed before the flash utility can be run.

WARNING!! Be very careful when changing flash contents; incorrect data may render the QCP2340/2342 HBA unusable to the point that the operating system may no longer function.

Perform the following steps to run the flash utility:

1. Copy the qla2x00flash file and the ifp2312.prom file to the desired directory.
2. At the command line, enter the appropriate path. Use the information obtained with the **show-devs** command (see step 1 in section 3.4.4). For example:

```
./qla2x00flash -l /devices/pci@1f,0/pci@1/QLGC,qla@4:
devctl ifp2312.prom
```

   For the QCP2342, the second channel must be run as well, for example:

```
./qla2x00flash -l /devices/pci@1f,0/pci@1/QLGC,qla@4,1:
devctl ifp2312.prom
```

3.4.2 Setting the QCP2340/2342 HBA Connection Mode

Perform the following steps to view the current QCP2340/2342 HBA connection mode and change it if necessary.

1. To view the current connection mode, type the **show-connection-mode** command:

```
ok show-connection-mode
```

The connection mode and options display. For example:

```
Current HBA connection mode: 2 - Point-to-point only

Possible connection mode choices:
0 - Loop Only
1 - Point-to-point only
2 - Loop preferred, otherwise point-to-point
```

2. If the connection mode is not correct based on the devices connected to the QCP2340/2342 HBA, change it using the **set-connection-mode** command. For example:

```
ok 0 set-connection-mode
```

The new connection mode displays. For example:

```
Calculating NVRAM checksum, please wait...

Current HBA connection mode: 0 - Loop Only

Possible connection mode choices:
0 - Loop Only
1 - Point-to-point only
2 - Loop preferred, otherwise point-to-point
```

3.4.3 Setting the QCP2340/2342 HBA Loop ID

When the QCP2340/2342 HBA is currently operating in loop mode (through connection mode 0 or connection mode 2), perform the following steps to view its loop ID and change it if necessary:

1. To view the loop ID, type the **show-adapter-loopid** command.

```
ok show-adapter-loopid
```

The loop ID displays. For example:

```
Adapter loopid - 7c
```

2. If the loop ID is not correct, change it using the **set-adapter-loopid** command. For example:

```
ok 0 set-adapter-loopid
```

The new loop ID displays. For example:

```
Adapter loopid - 0
```

3.4.4
Selecting the Boot Device

Perform the following steps to select a Fibre Channel device that is attached to the QCP2340/2342 HBA as the boot device:

1. Use the **show-devs** command to display the device tree for all devices attached to the machine.

   ```
   ok show-devs
   ```

   The device tree displays. The QCP2340/2342 HBAs with FCode are referenced with `QLGC,qla@`. For example:

   ```
   ok show-devs
   .
   .
   /pci@1f,0/pci@1/QLGC,qla@4 (QCP2340, QCP2342 first channel)
   /pci@1f,0/pci@1/QLGC,qla@4,1 (QCP2342, second channel)
   ```

2. Select the QCP2340/2342 HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt:

   ```
   ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
   ```

3. Use the **show-children** command to view the devices attached to the QCP2340/2342 HBA. For example:

   ```
   ok show-children
   ```

4. The list of devices displays. Write down the boot device's world wide name (WWN), loop ID, and logical unit number (LUN).

5. Save the boot device information to the QCP2340/2342 HBA's NVRAM. Use the **set-boot-id** command. Include the selected QCP2340/2342 HBA's WWN, loop ID, and LUN. For example:

   ```
   ok 2200002037009eeb 82 0 set-boot-id
   ```

   The following displays:

   ```
   Calculating NVRAM checksum, please wait.... done
   Boot device login successful
   Boot WWN - 20000020 37009eeb WWPN - 22000020 37009eeb
     Id - 82  Lun - 0
   ok
   ```

6. To boot the QCP2340/2342 HBA, type the complete boot path, including the loop ID and LUN. The loop ID and LUN must match those entered in step 5. For example:

   ```
   ok boot /pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
   ```

   NOTE: Enter the **reset** command before attempting to boot if the boot was interrupted or any of the QLogic FCode commands were executed.

3.4.5
Building the Bootable Disk

This procedure assumes that the system is already booted from an existing system hard disk, and that you have already performed a full system backup.

The device path on each system differs, depending on the PCI bus slot, target ID, LUN, etc. The device name shown in this example is for a device on the third PCI bus slot, target ID 130, LUN 0, slice 0.

You must have already completed the steps in the previous sections before attempting to create a bootable disk.

To build a bootable disk, perform the following steps:

1. Determine the amount of disk space used/available on your current boot disk. Use the **df** command for a listing. For example:

```
/usr/bin/df -k -l
```

```
Filesystem          kbytes    used     avail    capacity  Mounted on
/dev/dsk/c0t0d0s0   2577118  1650245   875331     66%     /
/proc                     0        0        0      0%     /proc
fd                        0        0        0      0%     /dev/fd
mnttab                    0        0        0      0%     /etc/mnttab
swap                1310480        0  1310480      0%     /var/run
swap                1311344      864  1310480      1%     /tmp
/dev/dsk/c0t0d0s7   5135326      114  5083859      1%     /home
```

   This df example shows that the current boot disk is /dev/dsk/c0t0d0s(x). There are two partitions of interest, slice 0 (/) and slice 7 (/home). Slice 0 uses 1.65 GB and has 875 MB free. Slice 7 uses 114 MB and has 5 GB free. Therefore, slice 7 (/home) contains enough disk space to store the temporary saveset files.

   If there were not at least 1.7 GB free on this disk, you would need to create a partition on the new bootable disk large enough to hold the largest temporary saveset files plus the largest used space on a partition. In this example, it would be a 3.2 GB (1.6 GB+1.6 GB) partition.

2. Use the **format** command to create, label, and format partitions on the new bootable disk. These partitions must be able to contain the contents of your temporary saveset files. If you are not familiar with the **format** command, refer to the Solaris documentation.

   WARNING!! Misusing the **format** command can destroy the data on your current disk drives.

a. At the root prompt, type `format`.

b. A list of available hard disks displays. Specify the disk.

c. At the format prompt, type `partition`.

d. At the partition prompt, type `print`. The partition table displays, as in the following example.

```
Part          Tag    Flag     Cylinders    Size            Blocks
  0           root     wm       0 - 8738     4.00GB  (8739/0/0) 8389440
  1           swap     wu    8739 - 9188   210.94MB  (450/0/0)   432000
  2         backup     wu       0 - 9201     4.21GB  (9202/0/0) 8833920
  3     unassigned     wm              0          0  (0/0/0)          0
  4     unassigned     wm              0          0  (0/0/0)          0
  5     unassigned     wm              0          0  (0/0/0)          0
  6     unassigned     wm              0          0  (0/0/0)          0
  7     unassigned     wm              0          0  (0/0/0)          0
```

e. At the partition prompt, type `label`. Enter the label.

f. At the label prompt, type `quit`.

g. Type `quit` until the system prompt displays.

3. To create the file system, use the **newfs** command. For example:

```
newfs -v /dev/rdsk/c3t130d0s0
```

NOTE: The target device ID (t130) is in decimal. The hexadecimal value for the target ID is used in the boot command line shown in step 11.

4. Mount the boot partition to the /mnt mount point. For example:

```
mount /dev/dsk/c3t130d0s0 /mnt
```

5. Change to the root partition mount point directory. For example:

```
cd /mnt
```

6. Use the **ufsdump** utility to copy the root partition to the new book disk. For example:

```
ufsdump 0f - / | ufsrestore rf -
```

7. Use the **rm** command to delete the restoresymtable file:

```
rm restoresymtable
```

8. Install the boot block on the new boot disk. For example:

```
installboot /usr/platform/`uname -i`
/lib/fs/ufs/bootblk /dev/rdsk/c3t130d0s0
```

9. Edit the new vfstab file to properly mount the new partitions during boot. In this case, each reference to c0t0d0s0 is changed to c3t130d0s0. For example:

```
vi /mnt/etc/vfstab
```

10. Shut down the system. Type the following:

```
/sbin/init 0
```

11. Boot from the newly created boot disk. For example:

```
boot /pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
```

NOTE: The target device ID (`sd@82`) is in hexadecimal. The decimal value is used in step 3.

12. View the current dump device setting. For example:

```
# dumpadm
Dump content: kernel pages
Dump device: /dev/dsk/c0t0d0s1 (swap)
Savecore directory: /var/crash/saturn
Savecore enabled: yes
```

13. Change the dump device to the swap area of the new boot drive. For example:

```
# dumpadm -d /dev/dsk/c3t130d0s1
```

NOTE: Steps 14 and 15 set the newly created boot disk as the default boot disk. These steps are performed at the system OBP (ok) prompt.

14. Create an alias entry for the new boot device (optional). For example:

```
ok nvalias fibredisk /pci@1f,0/pci@1/QLGC,qla@4/sd@82,0
```

15. Set default boot device to be the new boot device (optional). For example:

```
ok setenv boot-disk fibredisk
```

3.4.6
Setting and Viewing the Fibre Channel Data Rate

Use the show-data-rate command to view the current QCP2340/2342 Fibre Channel data rate. For example:

```
ok show-data-rate
Current HBA data rate: One Gigabit rate
```

Use the set-data-rate command to change the current QCP2340/2342 Fibre Channel data rate. For example:

```
ok 1 set-data-rate
Calculating NVRAM checksum, please wait...
Current HBA data rate: Two Gigabit rate
```

Table 3-2 lists the values to enter and their corresponding data rates.

Table 3-2. Fibre Channel Data Rates

Value	Data Rate
0	One gigabit
1	Two gigabits
2	Auto-negotiated rate

3.5
Specifications

Tables 3-3 and 3-4 define the QCP2340/2342 specifications.

Table 3-3. QCP2340/2342 Board Operating Environment

Environment	Minimum	Maximum
Operating temperature	0°C/32°F	55°C/131°F
Storage temperature	–20°C/–4°F	70°C/158°F
Relative humidity (noncondensing)	10%	90%
Storage humidity (noncondensing)	5%	95%

Table 3-4. QCP2340/2342 Board Specifications

Type	Specification
Host bus	Conforms to *PCI Local Bus Specification*, revision 2.1
Fibre Channel specifications	Bus type: fibre optic media Bus transfer rate: 200 MBps maximum at half duplex 400 MBps maximum at full duplex Interface chip: ISP2312
Central processing unit (CPU)	Single-chip design that includes a RISC processor, Fibre Channel protocol manager, DMA controller, and 2-Gb transceivers

Table 3-4. QCP2340/2342 Board Specifications (Continued)

Type	Specification
RAM	256K bytes of synchronous SRAM (SSRAM) per RISC
NVRAM	256 bytes, field programmable
Flash	512K bytes of flash ROM, field programmable
On-board DMA	Three independent DMA channels: two data and one command. Integrated frame buffer FIFOs (6K-byte receive and 4K-byte transmit) for each data channel.
Connectors	LC-style connector that supports non-OFC, multimode fibre optic cabling using 2×5 fibre optic transceiver module.
Form factor	16.0 cm × 10.0 cm (6.3" × 3.9")
Operating power	Less than 15 watts

3.6 Label

The transceiver on the QCP2340/2342 HBA is a Class I laser product. It complies with IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions.

CLASS I LASER PRODUCT

3.7 Agency Certification

The following sections contain a summary of the EMC/EMI test specifications performed on the QCP2340/2342 (CF2310402) to comply with radiated emission, radiated immunity, and product safety standards.

3.7.1 EMI and EMC Requirements

The QCP2340/2342 conforms to the following requirements:

- FCC Part 15, Class A
  - Radiated Emission Class A
  - Conducted Emission Class A
- ICES-003, Class A, Industry Canada
- 89/336/EEC EMC Directive CE

- EN55022:1995 Class A
  - Radiated Emission Class A
  - Conducted Emission Class A
- EN55024:1998
  - Immunity Standards
  - EN61000-4-2 :1995 ESD
  - EN61000-4-3 :1995 RF Electro Magnetic Field
  - EN61000-4-4 :1995 Fast Transient/Burst
  - EN61000-4-5 :1995 Fast Surge Common/Differential
  - EN61000-4-6 :1996 RF Conducted Susceptibility
  - EN61000-4-8 : 1994 Power Frequency Magnetic Filed
  - EN61000-4-11: 1994 Voltage Dips and Interrupt
- EN61000-3-2:1995 Harmonic Current Emission
- EN61000-3-3:1994 Voltage Fluctuation and Flicker

- VCCI, Class A certified
- AS/NZS 3548 Class A C-tick
- CNS 13438 Class A BMSI

3.7.2 Product Safety Requirements

- UL, cUL
  - UL6095050
  - CSA C22.2 No 60950
  - Class 1 Laser Product per DHHS 21CFR (J)
- 73/23/EEC Low Voltage Directive
  - TUV: EN60950:2000
  - TUV: EN 60825-1/A11:1996 EN 60825-1:1994+A11

Notes

Section 4

QSB2340/2342

4.1 QSB2340/2342 HBA Components

Figure 4-1 identifies the QSB2340/2342 HBA components referenced throughout this section.

Each QSB2340/2342 HBA has a unique serial number, located on the back of the HBA. Take a minute to write down the serial number of the QSB2340/2342 HBA in the unlikely event that the NVRAM is corrupted.

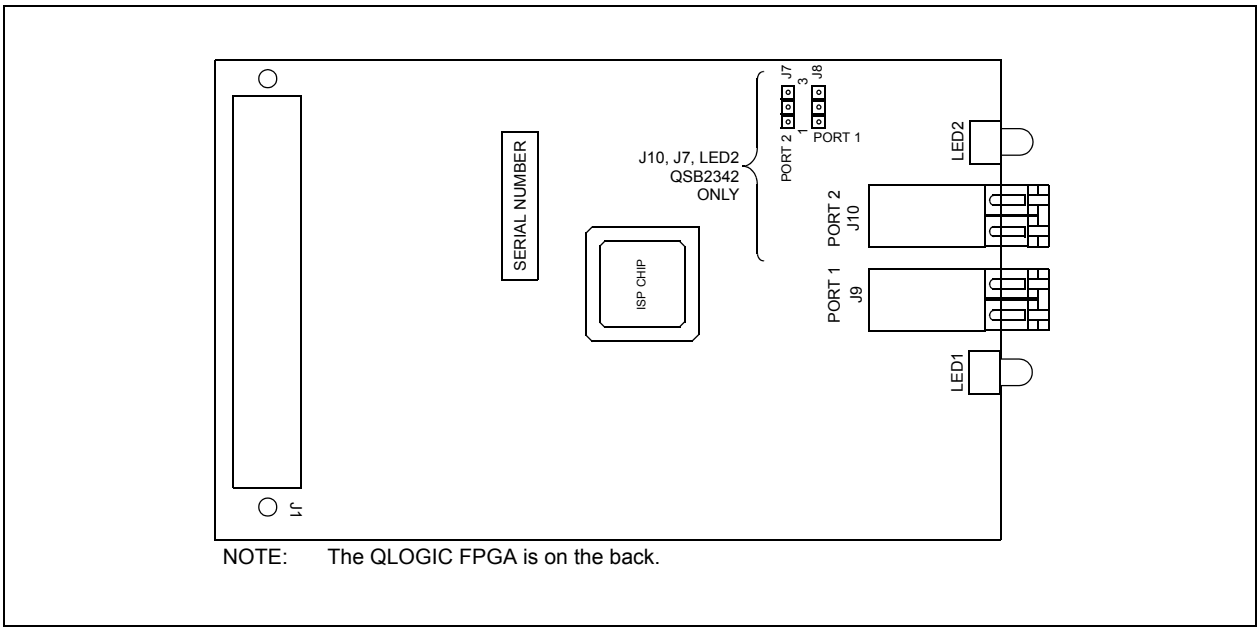

Figure 4-1. QSB2340/2342 HBA Layout

4.1.1 LEDs

The QSB2340/2342 LED1 and LED2 (QSB2342) function as shown in table 4-1.

Table 4-1. LED1 and LED2 (QCP2342) Activity

Green LED	Amber LED	Activity
On	On	Power
On	Off	Online
Off	On	Signal acquired
Off	Flashing	Loss of synchronization
Flashing	Flashing	Firmware error

4.1.2 Jumpers

Jumpers J7 (QSB2342) and J8 on the QSB2340/2342 HBA determine the default state of connectors J10 (QSB2342) and J9, respectively. The jumpers are set at the factory with a jumper plug on pins 2–3, which enables the connectors.

CAUTION! Changing the jumper settings can result in the HBA being inoperable.

4.2 Installation in the Computer

Before you install the QSB2340/2342 HBA in your computer, you need the following:

- A screwdriver (usually a Phillips #1)
- An optical, multimode cable with an LC-style duplex connector

Perform the following steps to install the QSB2340/2342 HBA in your system:

1. Shut down the computer.
2. Remove the computer cover and save the screws.
3. Choose any available SBus slot.
4. Remove the slot cover.
5. Place the QSB2340/2342 HBA into the slot. Carefully press the HBA into the slot until it seats firmly.
6. Connect the appropriate cable from the devices to the J1 and J2 connectors.
7. Carefully reinstall the computer cover. Insert and tighten the computer cover screws.
8. Power up all external FC devices, then power up the system and observe the monitor.

   NOTE: SunSPARC systems do not display the BIOS banner.

See section 6 for detailed instructions on how to install the software driver.

If you need FCode, see section 4.3 for instructions on how to install or update the FCode on the QSB2340/2342 HBA.

4.3 FCode

This section provides instructions for installing FCode on a QSB2340/2342 HBA installed in a Solaris SPARC system. A QSB2340/2342 HBA with FCode loaded in its flash ROM provides boot capability to its attached devices.

The following files are included. Be sure to review the readme.txt file for both new and changed information.

- 2312fs.prom—FCode binary file
- readme.txt—FCode readme file
- qla2x00fcode—Solaris flash utility
- readme—readme for qla2x00FCode

The procedure for installing FCode flash is summarized in the following steps and explained in detail in the following sections.

1. Update FCode on the QSB2340/2342 HBA (see section 4.3.1).
2. Set the QSB2340/2342 HBA connection mode (see section 4.3.2).
3. Set the QSB2340/2342 HBA loop ID (see section 4.3.3).
4. Select the boot device (see section 4.3.4).
5. Build the bootable disk (see section 4.3.5).

4.3.1 Updating FCode on the QSB2340/2342 HBA

If you need to update the FCode on the QSB2340/2342 HBA, use the QLogic qla2x00 flash utility. A QLogic Solaris SPARC driver revision 3.07 or later must be installed before this flash utility can be run.

WARNING!! Be very careful when changing flash contents; incorrect data may render the QSB2340/2342 HBA unusable to the point that the operating system may no longer function.

Perform the following steps to run the utility.

1. Copy the qla2x00fcode file and the 2312fs.prom file to the desired directory.
2. At the command line, enter the appropriate path. Use the information obtained using the **show-devs command** (see section 4.3.4). For example:

```
qla2x00fcode -l /devices/sbus@1f,0/QLGC,qla@1,30000:
devctl 2312fs.prom
```

4.3.2
Setting the QSB2340/2342 HBA Connection Mode

Perform the following steps to view the current QSB2340/2342 HBA connection mode and change it if necessary:

1. Perform steps 1 and 2 in section 4.3.4.
2. To view the current connection mode, type the **show-connection-mode** command.

   ```
   ok show-connection-mode
   ```

   The connection mode and options display. For example:

   ```
   Current HBA connection mode: 2 - Point-to-point only

   Possible connection mode choices:
   0 - Loop Only
   1 - Point-to-point only
   2 - Loop preferred, otherwise point-to-point
   ```

3. If the connection mode is not correct based on the devices connected to the QSB2340/2342 HBA, change it using the **set-connection-mode** command. For example:

   ```
   ok 0 set-connection-mode
   ```

   The new connection mode displays. For example:

   ```
   Calculating NVRAM checksum, please wait...

   Current HBA connection mode: 0 - Loop Only

   Possible connection mode choices:
   0 - Loop Only
   1 - Point-to-point only
   2 - Loop preferred, otherwise point-to-point
   ```

4.3.3
Setting the QSB2340/2342 HBA Loop ID

When the QSB2340/2342 HBA is currently operating in loop mode (through connection mode 0 or connection mode 2), perform the following steps to view its loop ID and change it if necessary.

1. Perform steps 1 and 2 in section 4.3.4.
2. To view the loop ID, type the **show-adapter-loopid** command.

   ```
   ok show-adapter-loopid
   ```

   The loop ID displays. For example:

   ```
   Adapter loopid - 7c
   ```

3. If the loop ID is not correct, change it using the **set-adapter-loopid** command. For example:

   ```
   ok 0 set-adapter-loopid
   ```

   The new loop ID displays. For example:

   ```
   Adapter loopid - 0
   ```

4.3.4 Selecting the Boot Device

Perform the following steps to select a Fibre Channel device that is attached to the QSB2340/2342 HBA as the boot device.

1. Use the **show-devs** command to display the device tree for all devices attached to the machine.

   ```
   ok show-devs
   ```

   The device tree displays. The QSB2340/2342 HBAs are referenced with `/sbus@` and `QLGC,qla@`*n*`,`*xxxxx*, where:

   n = SBus slot number

   xxxxx = port number
   30000 denotes port 0
   30400 denotes port 1

   For example:

   ```
   ok show-devs
   .
   .
   /sbus@1f,0/QLGC,qla@0,30000
   /sbus@1f,0/QLGC,qla@0,30400
   /sbus@1f,0/QLGC,qla@1,30000
   /sbus@1f,0/QLGC,qla@1,30400
   ```

2. Select the port on the QSB2340/2342 HBA attached to the Fibre Channel device from which you want to boot. For example, type the following at the ok prompt to specify port 0 of the QSB2340/2342 HBA in SBus slot 1.

   ```
   ok select /sbus@1f,0/QLGC,qla@1,30000
   ```

3. Use the **show-children** command to view the devices attached to the QSB2340/2342 HBA port specified in step 2. For example:

   ```
   ok show-children
   ```

4. The list of devices displays. Write down the boot device's world wide name (WWN), loop ID, and logical unit number (LUN).

5. Save the boot device information to the QSB2340/2342 HBA's NVRAM. Use the **set-boot-id** command. Include the selected QSB2340/2342 HBA's WWN, loop ID, and LUN. For example:

```
ok 2200002037009eeb 82 0 set-boot-id
```

The following displays:

```
Calculating NVRAM checksum, please wait.... done
Boot device login successful
Boot WWN - 20000020 37009eeb WWPN - 22000020 37009eeb
   Id - 82  Lun - 0
ok
```

```
To boot the QSB2340/2342 HBA, type the complete boot path,
including the loop ID and LUN. The loop ID and LUN must match
those entered in step 5. For example:
```

```
ok boot /sbus@1f,0/QLGC,qla@1,30000/sd@82,0
```

NOTE: Enter the **reset** command before attempting to boot if the boot was interrupted or any of the QLogic FCode commands were executed.

4.3.5 Building the Bootable Disk

This procedure assumes that the system is already booted from an existing system disk, and that you have already performed a full system backup.

The device path on each system differs, depending on the SBus slot, target ID, LUN, etc. The device name shown in this example is for a device on the third SBus slot, target ID 130, LUN 0, slice 0.

You must have already completed the steps in the previous sections before attempting to create a bootable disk.

This procedure involves using the Solaris **ufsdump** command to create temporary saveset files for each partition on your current boot disk. For this method to be successful, you must have enough extra disk space to create the saveset files, or your Solaris machine must have a high-capacity tape drive attached.

To build a bootable disk, perform the following steps:

1. Determine the amount of disk space used/available on your current boot disk. Use the **df** command for a listing. For example:

```
/usr/bin/df -k -l
```

```
Filesystem          kbytes    used     avail    capacity  Mounted on
/dev/dsk/c0t0d0s0   2577118   1650245  875331      66%    /
/proc               0         0        0            0%    /proc
fd                  0         0        0            0%    /dev/fd
mnttab              0         0        0            0%    /etc/mnttab
swap                1310480   0        1310480      0%    /var/run
swap                1311344   864      1310480      1%    /tmp
/dev/dsk/c0t0d0s7   5135326   114      5083859      1%    /home
```

   This df example shows that the current boot disk is /dev/dsk/c0t0d0s(x). There are two partitions of interest, slice 0 (/) and slice 7 (/home). Slice 0 uses 1.65 GB and has 875 MB free. Slice 7 uses 114 MB and has 5 GB free. Therefore, slice 7 (/home) contains enough disk space to store the temporary saveset files.

   If there were not at least 1.7 GB free on this disk, you would need to create a partition on the new bootable disk large enough to hold the largest temporary saveset files plus the largest used space on a partition. In this example, it would be a 3.4 GB (1.7 GB+1.7 GB) partition.

2. Use the **format** command to create, label, and format partitions on the new bootable disk. These partitions must be able to contain the contents of your temporary saveset files. If you are not familiar with the **format** command, refer to the Solaris documentation.

   WARNING!! Misusing the **format** command can destroy the data on your current disk drives.

a. At the root prompt, type `format`.

b. A list of available hard disks displays. Specify the disk.

c. At the format prompt, type `partition`.

d. At the partition prompt, type `print`. The partition table displays, as in the following example.

```
Part          Tag    Flag     Cylinders    Size            Blocks
  0         root     wm       0 - 8738     4.00GB  (8739/0/0) 8389440
  1         swap     wu    8739 - 9188   210.94MB  (450/0/0)   432000
  2       backup     wu       0 - 9201     4.21GB  (9202/0/0) 8833920
  3   unassigned     wm              0          0  (0/0/0)          0
  4   unassigned     wm              0          0  (0/0/0)          0
  5   unassigned     wm              0          0  (0/0/0)          0
  6   unassigned     wm              0          0  (0/0/0)          0
  7   unassigned     wm              0          0  (0/0/0)          0
```

e. At the partition prompt, type `label`. Enter the label.

f. At the label prompt, type `quit`.

g. Type `quit` until the system prompt displays.

3. To create the file system, use the **newfs** command. For example:

```
newfs -v /dev/rdsk/c3t130d0s0
```

NOTE: The target device ID (t130) is in decimal. The hexadecimal value for the target ID is used in the boot command line shown in step 11.

4. Mount the boot partition to the /mnt mount point. For example:

```
mount /dev/dsk/c3t130d0s0 /mnt
```

5. Change to the root partition mount point directory. For example:

```
cd /mnt
```

6. Use the **ufsdump** utility to copy the root partition to a dump file and copy the dump file to the new boot device. For example:

```
-ufsdump 0f - /|ufstestore rf -
```

7. Use the **rm** command to delete the restoresymtable file.

```
rm restoresymtable
```

8. Install the boot block on the new boot disk. For example:

```
installboot /usr/platform/`uname -i`/lib/fs/ufs/
bootblk /dev/rdsk/c3t130d0s0
```

9. Edit the new vfstab file to properly mount the new partitions during boot. In this case, each reference to c0t0d0s0 is changed to c3t130d0s0. For example:

```
vi /mnt/etc/vfstab
```

10. Shutdown the system. Type the following:

```
/sbin/init 0
```

11. Boot from the newly created boot disk. For example:

```
boot /sbus@1f,0/QLGC,qla@1,30000/sd@82,0
```

NOTE: The target device ID (sd@82) is in hexadecimal. The decimal value is used in step 3.

4.4 Specifications

Tables 4-2 and 4-3 define the QSB2340/2342 specifications.

Table 4-2. QSB2340/2342 Board Operating Environment

Environment	Minimum	Maximum
Operating temperature	0°C/32°F	55°C/131°F
Storage temperature	–20°C/–4°F	70°C/158°F
Relative humidity (noncondensing)	10%	90%
Storage humidity (noncondensing)	5%	95%

Table 4-3. QSB2340/2342 Board Specifications

Type	Specification
Host bus	Conforms to *SBus Specification*, IEEE std 1496-1993
Fibre Channel specifications	Bus type: fibre optic media Bus transfer rate: 200 MBps maximum at half duplex 400 MBps maximum at full duplex Interface chip: ISP2312
Central processing unit (CPU)	Single-chip design that includes a RISC processor, Fibre Channel protocol manager, DMA controller, and 2-Gb transceivers
RAM	256K bytes of SRAM per RISC
NVRAM	256 bytes, field programmable
Flash	512K bytes of flash ROM, field programmable
Onboard DMA	Three independent DMA channels: two data and one command. Integrated frame buffer FIFOs (4K-byte receive and 4K-byte transmit) for each data channel.
Connectors	LC-style duplex connector that supports non-OFC, multimode fibre optic cabling using 2×5 fibre optic transceiver module.

Table 4-3. QSB2340/2342 Board Specifications (Continued)

Type	Specification
Form factor	14.7 cm×8.4 cm (5.8"×8.4")
Operating power	Less than 15 watts

4.5
Label

The transceiver on the QSB2340/2342 HBA is a Class I laser product. It complies with IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions.

CLASS I LASER PRODUCT

4.6
Agency Certification

The following sections contain a summary of the EMC/EMI test specifications performed on the QSB2340/2342 (SF0310401) to comply with radiated emission, radiated immunity, and product safety standards.

4.6.1
EMI and EMC Requirements

The QSB2340/2342 conforms to the following requirements:

- FCC Part 15, Class B
  - Radiated Emission Class B
  - Conducted Emission Class B
- ICES-003 Class B, Industry Canada
- 89/336/EEC EMC Directive CE
  - EN55022:1995 CISPR 22:1997 Class B
    - Radiated Emission Class B
    - Conducted Emission Class B
  - EN55024:1998
    - Immunity Standards
    - EN61000-4-2 :1995 ESD
    - EN61000-4-3 :1995 RF Electro Magnetic Field
    - EN61000-4-4 :1995 Fast Transient/Burst

- ❑ EN61000-4-5 :1995 Fast Surge Common/Differential
- ❑ EN61000-4-6 :1996 RF Conducted Susceptibility
- ❑ EN61000-4-8 : 1993 Power Frequency Magnetic Filed
- ❑ EN61000-4-11: 1994 Voltage Dips and Interrupt

- ❑ EN61000-3-2:1995 Harmonic Current Emission
- ❑ EN61000-3-3:1995 Voltage Fluctuation and Flicker

- ■ VCCI, Class B
- ■ AS/NZS 3548 Class B

4.6.2
Product Safety Requirements

- ■ UL, cUL
  - ❑ UL60950
  - ❑ CSA C22.2 No 60950
  - ❑ Class 1 Laser Product per DHHS 21CFR (J)

Notes

Section 5

Troubleshooting

5.1

Problems After Installation

There are two basic types of installation problems that can cause your QCP/QSB23*xx* HBA to function incorrectly: hardware problems and Fibre Channel problems. The following section provides itemized checklists to help you determine why your QCP/QSB23*xx* HBA is not functioning.

5.2

Hardware Problem Checklist

- Are all of the circuit cards installed securely in the system?
- Are all of the cables securely connected to the correct connectors? Be sure that the FC cables that attach from the QCP/QSB23*xx* HBA connectors to the device are connected correctly. For example, the optical transmit connector on the QCP/QSB23*xx* HBA must be connected to the optical receive connector on the device. Some connectors require a firm push to ensure proper seating. An easy way to check for correct seating is to switch the connectors on either the QCP/QSB23*xx* HBA or the device, then restart your system.
- Is the QCP/QSB23*xx* HBA installed correctly? Is it seated firmly in the slot?
- Check for interference due to nonstandard PCI connectors.
- Are all external peripherals properly powered up?

5.3

Fibre Channel Problem Checklist

- Were all of the FC devices powered up before you powered up the PC?
- Check that all cables are properly connected.
- Some Fibre Channel switches support zoning. Make sure that your switch is configured correctly.
- Make sure that the data rate of the QCP/QSB23*xx* HBA matches the target device. For example, if the QCP/QSB23*xx* HBA data rate is 2 Gb, the target device must also be set to 2 Gb.

Notes

Part II
Software

This part of the *SANblade 2300 User's Guide* describes how to install the software drivers for the supported operating systems. See the section that corresponds to your computer's operating system:

Operating System	Section
Solaris SPARC	6

Before you install the software drivers, you need to locate and download the appropriate drivers for your operating system. The latest version of the QLA23*xx* drivers are located on the QLogic Web site, www.qlogic.com.

QLogic drivers are self-extracting and meant to be downloaded onto disks. The installation instructions in this guide assume that the QLogic drivers reside on disks.

Notes

Section 6

Solaris SPARC Driver Installation (QL2300)

6.1 Introduction

This section provides instructions for installing the Solaris SPARC driver in an already installed Solaris SPARC operating system. The naming convention for the drivers, associated files, and messages is QLA; however, the Solaris SPARC driver supports standard QLogic PCI HBAs (*QLAxxxx*), cPCI HBAs (*QCPxxxx*), and SBus HBAs (*QSBxxxx*).

The latest version of the Solaris SPARC driver package is available on the QLogic web site (www.qlogic.com). The files in the driver package cannot be read nor installed from a DOS environment. Be sure to review the Readme.txt file for both new and changed information.

To install the driver from a CD-ROM, see section 6.3. To install the driver from the QLogic Web site, see section 6.4. If you are installing the driver from another media, for example, a floppy disk, transfer the qla2300.Z file to a temporary directory on the machine where the driver will be installed, then continue with step 4 in section 6.4.

6.2 Pre-installation Requirements

Before you install the Solaris driver, uninstall any existing QLA2300 driver using the pkgrm utility.

NOTE:

- If you are uninstalling Solaris driver version 4.07 or later, the Solaris pkgrm utility creates a backup copy of the qla2300.conf configuration file in the /kernel/drv directory.
- If you are uninstalling a driver version before 4.07, QLogic recommends that you manually create a backup copy of the qla2300.conf configuration file.
- To upgrade from qla2300 driver version 4.11 (and earlier) to qla2300 driver version 4.12 (and above), you must remove the appropriate qla2300 driver package before installing the new one, even though the package name has been changed and may not appear to be conflicting.

qla2300 driver versions 4.11 (and earlier) have the following package names:

- QLA2300-1 (Solaris 2.6)
- QLA2300-2 (Solaris 2.7)
- QLA2300-3 (Solaris 2.8 and 9)

Checks within the package installation will terminate the new driver installation if a pervious version of the driver package is found.

For additional information, please review the latest Solaris README.TXT file, available on the QLogic web site (www.qlogic.com).

6.3 Installing the Solaris SPARC Driver from a CD-ROM

Perform the following steps to install the Solaris SPARC driver from a CD-ROM to your system.

NOTE: To install the QLA2300 driver, you must have superuser privileges.

1. Log on to the system as superuser.
2. Create a temporary directory where you can copy the driver.
3. Change the directory (cd) to the CD-ROM mount point (usually /cdrom, but the location varies. Ask your system administrator for the specific directory).
4. Change the directory (cd) to the Solaris directory.
5. Copy (cp) the qla2300_pkg.Z file from the CD-ROM to the temporary directory created in step 2.
6. Change the directory (cd) to the temporary directory created in step 2.
7. At the command prompt, type:

```
uncompress ./qla2300_pkg.Z
```

8. Step 7 produces a file in the same directory called qla2300_pkg.
9. At the command prompt, type:

```
pkgadd -d ./qla2300_pkg
```

10. Continue with step 7 in section 6.4.

6.4 Installing the Solaris SPARC Driver from the QLogic Web Site

Perform the following steps to download the Solaris SPARC driver from the web to your hard disk, then install the driver on your system.

NOTE: To install the QLA2300 driver, you must have superuser privileges.

1. Log on to the system as a superuser.
2. Download the driver package from the QLogic Web site (www.qlogic.com) to a directory on the Solaris machine's hard disk.
3. At the command prompt, change the directory (cd) to the directory where the file was downloaded.
4. At the command prompt, type:

   ```
   uncompress ./qla2300_pkg.Z
   ```

5. Step 4 produces a file in the same directory called qla2300_pkg.
6. At the command prompt in the directory where the file was uncompressed, type:

   ```
   pkgadd -d ./qla2300_pkg
   ```

7. You are prompted to select a driver package. For example:

   ```
   The following packages are available:
   1  QLA2300        QLogic QLA2300 driver
                     (sparc) Solaris, Rev=X.XX

   2  QLSDMLIB       QLogic SDM Library
                     (sparc) Solaris 7-8-9, Rev=X.XX

   3  QLSDMLIB6      QLogic SDM Library
                     (sparc) Solaris 2.6, Rev=X.XX

   Select package(s) you wish to process (or 'all'
   to process all packages). (default: all)
   [?,??,q]:
   ```

   NOTE: The revision number, X.XX, indicates the version of the driver.

8. Type the number associated with the Solaris SPARC version on your system. Separate the numbers by pressing the SPACEBAR.
   a. Type `1` to install the driver package.
   b. If you are installing the storage networking industry association (SNIA) application programming interface (API) libraries, type `2` or `3`.

   For example, type the following to install the driver and SDM library for a Solaris 8 system:

   ```
   Select package(s) you wish to process (or 'all'
   to process all packages). (default: all)
   [?,??,q]: 1 2
   ```

   Press ENTER to continue.

9. You are prompted to select the directory where the driver will be installed. For example:

```
Processing package instance <QLA2300> from
</tmpdir/qla2300_pkg>

QLogic QLA2300 driver
(sparc) Solaris, Rev=X.XX

Copyright (c) 1996-2003, by QLogic Corporation. All rights
reserved.

Where do you want the driver object installed
(default=/kernel/drv):
```

10. Press ENTER to accept the default.
11. The pkgadd program performs a series of checks, then posts a script warning and asks whether to continue the installation. For example:

```
Using </> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with
super-user permission during the process of installing this
package.

Do you want to continue with the installation of <QLA2300>
[y,n,?]
```

12. Type `y` and press ENTER to continue the driver installation. The pkgadd program notifies you when the driver installation is complete. For example:

```
Installing QLogic QLA2300 driver as <QLA2300>

## Installing part 1 of 1.
/kernel/drv/q2ip
/kernel/drv/q2ip.conf
/kernel/drv/q2ip_v9
/kernel/drv/qla2300
/kernel/drv/qla2300.conf
/kernel/drv/qla2300_v9
[  verifying class <none>  ]
## Executing postinstall script

Installation of <QLA2300> was successful.
```

If you are not installing an SDM API library, continue with step 15.

13. The pkgadd program then installs the SDM library, if selected in step 8. A script warning is posted, asking whether to continue the installation. For example:

```
Processing package instance <QLSDMLIB> from
</tmpdir/qla2300_pkg>

QLogic SDM Library
(sparc) Solaris 7-8-9, Rev=X.XX

Copyright (c) 2003, by QLogic Corporation. All rights reserved.

## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with
super-user permission during the process of installing this
package.

Do you want to continue with the installation of <QLSDMLIB>
[y,n,?] y
```

14. Type `y` and press ENTER to continue the driver installation. The pkgadd program notifies you when the SDM library installation is complete. For example:

```
Installing QLogic SDM Library as <QLSDMLIB>

## Installing part 1 of 1.
/tmp/hba.conf
/usr/lib/libqlsdm.a
/usr/lib/libqlsdm.so
[ verifying class <none> ]
## Executing postinstall script.
Setting up QLSDM library...

Installation of <QLSDMLIB> was successful.
```

15. Type the following text to reboot and reconfigure the system:

```
reboot -- -r
```

16. See the README.TXT file in the Solaris directory (on the SANsurfer Management Suite CD-ROM or the QLogic web site (www.qlogic.com)) for possible modifications to the qla2300.conf, sd.conf, and st.conf files. These modifications include configuring devices and driver parameters.

6.5 FCode

If you need FCode, see the appropriate section for instructions on how to install or update the FCode on the QCP/QSB23*xx* board.

Notes